

11/1/92

## 1 SPECIFICATION

## 3 CAB FOR CONSTRUCTION MACHINE

## 5 Field of the Art

6 This invention relates generally to construction machines such as  
7 hydraulic power shovel type excavators and the like, and more  
8 particularly to a cab for a construction machine, providing a reinforced  
9 operating room for an operator at the control of the construction  
10 machine.

## 11 Technical Background

12 In the case of hydraulic power shovel type excavators, a crawler-  
13 or wheel-type drive is mounted on a frame of a vehicular base carrier,  
14 and an upper rotary body is mounted on the base carrier through a  
15 rotary mechanism. Further, a front working mechanism is mounted on  
16 top of the upper rotary body to perform ground excavating operations.  
17 The front working mechanism is largely constituted by a boom, an arm  
18 and a front attachment. For a ground excavating operation, a bucket is  
19 attached to the arm. The base end of the boom, which constitutes the  
20 front working mechanism, is pivotally supported on the upper rotary

body, and lifted up and down by means of a hydraulic cylinder. The arm is pivotally supported on a fore end portion of the boom and turned up and down relative to the boom by means of a hydraulic cylinder. The bucket as a front attachment is connected to a fore end portion of the arm through a link mechanism and turned toward and away from the arm similarly by means of a hydraulic cylinder.

The operations of the hydraulic power shovel type excavator, including drive of the vehicular base carrier, rotations of the upper rotary body by the rotary mechanism and operations of the front working mechanism, are controlled by an operator on the upper rotary body. For this purpose, a cab is provided on the upper rotary body, and an operator's seat to be seated by an operator is provided in the cab, along with operating levers or other operating means. In order to operate the excavator smoothly, it is necessary for the operator to have a broad view field on each side. More particularly, it is necessary for the operator to have a wide view field not only on the front and rear sides of the cab but also on the right and left sides and, in the case of a ground excavating operation, in downward and upward directions. In this regard, a wide and clear view field needs to be secured especially in directions forward of the cab, including obliquely upward or obliquely

1 downward directions. Therefore, the front side of the cab is almost  
2 entirely constituted by an window or windows. In some cases, a top  
3 window is provided in the roof of the cab continuously from a front  
4 window.

5 A cab is mounted on the upper rotary body of the excavator.  
6 Considering vibrations which are transmitted to the cab while the  
7 hydraulic power shovel type excavator in operation and possibilities of  
8 collisions against a nearby structural body, rocks or trees, the cab  
9 should have high strength as a structure. Normally, a cab is  
10 constituted by an enclosure including front and rear sections, right and  
11 left side sections and a roof section. A door is provided in one of the  
12 side sections of the cab to permit an operator get into and get out of the  
13 cab, and the other side section is located in a position in the proximity  
14 of a front working mechanism. A plural number of pillars are erected in  
15 the right and left side sections, and beams are bridged between the  
16 respective pillars. Normally, the pillars and beams are each constituted  
17 by a steel plate which is formed in a hollow columnar shape, and, for  
18 example, are assembled integrally with each other in the shape of an  
19 inverted U-shape. Accordingly, each side section of the cab is  
20 constituted by a frame structure which is composed of pillars and a

1 beam member, and either a door or a window is fitted in the frame  
2 structure. The cab has a similar frame structure on its rear side.  
3 Thus, it is primarily the side and rear frame structures on the right, left  
4 and rear sides of the cab that contribute to the structural strength of  
5 the cab itself. The roof section of the cab is also constituted by a steel  
6 plate, but hollow panel structures are employed in some cases to  
7 increase the strength of the roof section.

8 As already explained hereinbefore, on the front side, the cab  
9 enclosure is provided with a large window, which occupies almost the  
10 entire areas of the front section, for the purpose of ensuring a wide view  
11 field in forward directions. Therefore, in a case where a top window is  
12 additionally provided in the roof section for securing a view field in  
13 upward directions, the cab inherently has weak points in transitional  
14 portions from the front section to the roof section, as compared with  
15 other portions of the cab. In order to avoid this problem, a transverse  
16 or cross beam is bridged between the two side sections and in a  
17 transitional portion from the front to the top window for reinforcing  
18 purposes. This reinforcing transverse beam of this sort however will  
19 block a view field of an operator in the cab to a considerable degree if  
20 its thickness is increased from the standpoint of enhancing the

1 strength of the cab.

2 Therefore, it is desirable to impart necessary strength to the cab  
3 by increasing the strength of the frame structures of the side and rear  
4 sections instead of providing a thick reinforcing member in transitional  
5 portions from the front to roof window of the cab. This approach  
6 makes it possible to prevent the cab from easily undergoing crucial  
7 deformation or damages when impacts of certain magnitudes are  
8 externally applied thereto, while securing a broader view field for the  
9 operator both in forward and upward directions.

10 In operation, a hydraulic power shovel type excavator is often  
11 required to run on rough terrains with undulations and sporadically  
12 spotted with mounds and dimples. Therefore, the excavator can lose its  
13 balance while running on such a rough terrain. In the case of a crawler  
14 type excavator having a crawler type drive means on the vehicular base  
15 carrier, it is unlikely for the machine to fall down on its side even if it  
16 loses balance while in travel, because crawler belts have broad treading  
17 surface areas. However, the machine can fall down under certain  
18 circumstances, for example, in a case where the machine itself is ill-  
19 balanced and erroneously operated by an operator.

20 A front working mechanism is provided on an upper rotary body

1 of an excavator, on one side of a cab, normally on the right side of a  
2 cab, when seen by an operator who is seated forward on an operator's  
3 seat in the cab. Therefore, when an excavator happens to fall down to  
4 that side, there is little possibility of a falling load acting directly on the  
5 cab. However, should an excavator fall down to the opposite side, it is  
6 likely that a falling load of extremely large magnitude acts directly on  
7 the cab. In addition, in the case of a hydraulic power shovel type  
8 excavator having a cab and a front working mechanism at a close  
9 distance from each other for the purpose of minimizing the width of the  
10 machine, one side of the cab is subjected to impacts of collision against  
11 the ground and as a result the other side of the cab is collided against a  
12 closely opposing side of the front working mechanism. Therefore, on  
13 such an occasion, the cab is crushed and deformed from opposite sides  
14 easily if a falling load is imposed on a transitional portion between front  
15 to top windows of the cab where the strength against a lateral load is  
16 relatively low.

#### 17 DISCLOSURE OF THE INVENTION

18 With the foregoing situations in view, it is an object of the present  
19 invention to provide a cab for a construction machine, employing a  
20 reinforcing means in its structure to impart high strength and shape

1 retainability to the cab for preventing crucial deformation or collapsing  
2 even in the event the cab is subjected to a load of a large magnitude  
3 like a falling load, while guaranteeing a wide view field for an operator  
4 in the cab.

5 It is another object of the present invention to provide a cab for a  
6 construction machine like a power shovel type excavator, which can  
7 protect an operator in the cab safely even when the excavator happens  
8 to fall down on a ground while in operation.

9 In accordance with the present invention, for achieving the  
10 above-stated objectives, there is provided a cab for a construction  
11 machine, being mounted on an upper rotary body of the construction  
12 machine along with a working mechanism and providing an operating  
13 room within an enclosure consisting of a first side frame structure  
14 containing a door to be opened and closed by an operator, a second  
15 side frame structure located on the side of the working mechanism, a  
16 front section provided between front ends of the first and second side  
17 frame structures and substantially entirely occupied by a front window,  
18 a roof section, and a rear section, characterized in that the cab  
19 comprises: a cross beam member bridged between upper front corners  
20 of the first and second side frame structures to extend along upper side

1 of the front window; and a reinforcing beam member provided between  
2 the first and second side frame structures for reinforcing the cross  
3 beam member.

4 In a case where the roof section is provided with a roof window in  
5 a front portion thereof, preferably the cross beam is located in  
6 boundary regions between the front and roof windows. The reinforcing  
7 beam member should be located in a position where it will not block a  
8 view field of an operator in the cab to any objectionable degree. In this  
9 regard, preferably the reinforcing beam member is in the shape of a rod  
10 and located substantially in parallel and overlapping relation with the  
11 cross beam member. By so arranging, the reinforcing beam member  
12 can be substantially concealed behind cross beam member without  
13 blocking a view field of an operator when the operator who is seated on  
14 an operator's seat in the cab looks up in an obliquely upward direction  
15 toward the cross beam member between the front and roof windows of  
16 the cab. The opposite ends of the reinforcing beam member are  
17 securely connected to the first and second side frame structures. In a  
18 preferred form of the invention, the reinforcing beam member is bridged  
19 between brackets securely fixed to a front or lateral side of foremost  
20 pillars of the first and second side frame structures. The reinforcing



beam member which is provided on the outer side of the cab can be for mounting accessories of the construction machine, for example, accessories such as lighting lamp assemblies, mirrors, protector covers for dropping rocks or stones, sun shades, wipers etc. In a case where the cross beam member is constituted by a hollow columnar structure, the reinforcing beam member can be passed through an internal hollow cavity of the cross beam member. In any case, the reinforcing beam member should have high bending strength. Preferably, the reinforcing beam member is constituted by a metal pipe of a circular shape or triangular, square or other polygonal shape in cross section. In order to enhance the bending strength, a foaming resin such as foaming urethane can be filled in the internal cavity of the pipe.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

Fig. 1 is a schematic side view of a hydraulic power shovel type excavator, shown as a typical example of construction machines;

Fig. 2 is schematic front view of the excavator of Fig. 1;

Fig. 3 is a schematic outer view of a cab embodying the present invention;

Fig. 4 is an exploded perspective of the cab of Fig. 3;

1           Fig. 5 is a fragmentary sectional view of a joint portion of front  
2           and roof sections of the cab;

3           Fig. 6 is a sectional view of a reinforcing member;

4           Fig. 7 is a sectional view of a modified reinforcing member;

5           Fig. 8 is a schematic plan view of the cab having a reinforcing  
6           member attached thereto;

7           Fig. 9 is a schematic illustration explanatory of relations between  
8           the position of the reinforcing member on the cab and an operator's  
9           view field;

10          Fig. 10 is a schematic illustration explanatory of a manner in  
11          which an excavator is caused to fall down on the ground;

12          Fig. 11 is a schematic plan view of a cab having a reinforcing  
13          member attached thereto in a different manner from the cab of Fig. 8;

14          Fig. 12 is a schematic plan view of still another cab having a  
15          reinforcing member attached thereto in a manner different from Figs. 8  
16          and 11;

17          Fig. 13 is a sectional view similar to Fig. 5, but showing another  
18          modification of the reinforcing member;

19          Fig. 14 is a fragmentary front view of a cab having head light  
20          assemblies mounted thereon; and

1            Fig. 15 is a schematic view taken in the direction of arrow A in  
2            Fig. 14, showing the head light assemblies mounted on the cab.

3            BEST MODE FOR CARRYING OUT THE INVENTION

4            Hereafter, the present invention is described more particularly  
5            with reference to the accompanying drawings. Shown schematically in  
6            Figs. 1 and 2 is the general layout of a hydraulic power shovel type  
7            excavator as an example of construction machine, and in Fig. 3 is a cab  
8            of the excavator.

9            As clear from Figs. 1 and 2, the hydraulic power shovel type  
10           excavator is of a traveling type, and constituted by a vehicular base  
11           carrier 1 and an upper rotary body 2. The base carrier 1 is provided  
12           with a vehicle frame 3, and right and left crawlers 4 are mounted on  
13           and along the right and left sides of the vehicle frame 3, respectively.  
14           The upper rotary body 2 is mounted on the vehicle frame 3 through a  
15           rotary mechanism 5, so that a rotary frame 6 of the upper rotary body  
16           2 is rotatable relative to the base carrier 1. Mounted on the rotary  
17           frame 6 is a front working mechanism 7, including a boom 7a, an arm  
18           7b and a bucket or a front attachment 7c which are driven respectively  
19           by a hydraulic cylinder. The front working mechanism 7 is operated,  
20           for example, for excavating a ground. Further, an equipment housing 8

1 is provided on the rotary frame 6 to accommodate an engine, hydraulic  
2 pump and other equipments of the machine. Attached to the rear end  
3 of the rotary frame 6 is a counterweight 9 as a weight balance relative  
4 to the front working mechanism 7.

5 Indicated at 10 is a cab which is provided on a front portion of  
6 the rotary frame 6 side by side with the front working mechanism 7.  
7 More specifically, on a front portion of the rotary frame 10, the cab 10  
8 is located on the left side and the front working mechanism 7 is located  
9 on the right side. In order to reduce the body width of the excavator as  
10 much as possible, the cab 10 and the front working mechanism 7 are  
11 located at a minimum distance from each other. Although not shown  
12 in the drawings, an operator's seat is provided within the cab 10, along  
13 with operating means such as operating levers and a control box, which  
14 are located in positions in the vicinity of the operator's seat. Therefore,  
15 an operator who is seated on the operator's seat in the cab can control  
16 operations of the excavator as a whole.

17 Reference is now had to Fig. 3, an outer view of the cab 10, and  
18 to Fig. 4, an exploded view of major components of the cab 10. As seen  
19 in these figures, the cab 10 is constituted by right and left side sections  
20 11 and 12, a front section 13, a rear section 14, a roof section 15 and a

1 floor section 16. The cab 10 provides a substantially closed room for  
2 amenity to the operator.

3 Of the right and left side sections 11 and 12, the left side section  
4 11, which is located on the side away from the front working  
5 mechanism 7, is constituted by a first side frame structure which  
6 contains a door 20 with a window to permit an operator to get into or  
7 out of the cab 10 therethrough. On the other hand, a side window 21  
8 with a pane of transparent glass is fitted on the rear side of the door  
9 20. In contrast, the other side section 12, confronting face to face with  
10 the front working mechanism 7, is constituted by a second side frame  
11 structure with a side window 22. The front section 13 of the cab 10 is  
12 entirely occupied by a window 23 having a pane of transparent glass  
13 23b fitted in a window frame 23a. The rear section 14 of the cab is  
14 constituted by a rear frame structure 14 which contains a rear window  
15 25 at least above the level of the top end of the equipment housing 8  
16 which is located on the rear side of the cab 10. Further, the roof  
17 section 15 contains a roof window 25 in its front portion. The floor  
18 section 16 is constituted by a steel panel. Various operating means are  
19 located on the front side of an operator's seat which is mounted on the  
20 floor section 16, and a control box is located at one side of the

1 operator's seat.

2 In this manner, the enclosure of cab 10 contains a wide window  
3 on four sides and on the top side to provide as broad a view field as  
4 possible in all directions for the operator in the cab 10, that is to say, to  
5 minimize dead angles for the operator at the control of the excavator.  
6 The front working mechanism 7, which is extended out to perform an  
7 excavating operation at a position forward of the operator in the cab 10,  
8 is movable up and down over a wide angular range. Therefore, it is  
9 necessary for the operator to have the whole locus of movement of the  
10 front working mechanism 7, especially the whole range of movement of  
11 the bucket 7c constantly in his or her view field. In this regard, a wide  
12 view field is guaranteed for the operator in the cab 10, through the  
13 front window 23 which occupies almost the entire areas of the front  
14 section 12 and the roof window 25 which is provided in front portions  
15 of the roof section 15. Since the cab 10 is provided a wide window on  
16 all sides, the operator in the cab can check for existence of an obstacle  
17 or of other workers in a working range of the front working mechanism  
18 7 during rotation of the upper rotary body 2.

19 While the excavator is in operation, the whole machine body can  
20 be shaken largely by vibrations, or rocks and fragments of concrete

1 may drop on the cab 10. Besides, there are possibilities of the cab  
2 being collided against an ambient structure or trees. Therefore, the cab  
3 should have sufficient strength and durability. To meet this  
4 requirement, the first and second side frame structures 11 and 12 as  
5 well as the rear frame structure 14 of the cab is provided with pillars  
6 and a tie beam. These pillars and tie beam are each in the form of a  
7 hollow columnar structural material which is formed by folding and  
8 joining by welding a plural number of relatively thin steel sheets. The  
9 use of hollow structural members contributes to impart higher strength  
10 to the pillars and tie beams and to reduce the weight of the cab 10 as a  
11 whole.

12 On the rear side of the cab 10, the rear frame structure 14 is  
13 securely connected between the first and second side frame structures  
14 11 and 12 to provide a reliably strong structure. On the other hand,  
15 the on the front side of the cab 10, the front section 13 and the roof  
16 section 15 are provided between the first and second side frame  
17 structures 11 and 12. The front section 13 and the roof section 15 are  
18 joined with each other through a joint structure as shown in Fig. 15.  
19 As seen in the drawings, the front section 13 is constituted by the  
20 coextensive front window 23, while the roof window 25 in the roof

1 section 15 is extended to the front edge of the roof section 15. In order  
2 to increase strength against compressive loads on the first and second  
3 side frame structures 11 and 12, a cross beam member 26 is bridged  
4 between upper front corners of the side frame structures 11 and 12.

5 In one of particular examples shown in the drawings, the cross  
6 beam member 26 is in the shape of a hollow beam structure which is  
7 formed by welding together a couple of steel sheets 26a and 26b which  
8 are curved in a concave shape in intermediate portions between upper  
9 and lower joined edges. Seal members 27 are fitted on and along upper  
10 and lower joined edges of the cross beam 26, in intimate contact with  
11 inner surface of the roof window 25 and the window frame 23a of the  
12 front window 26, respectively. The opposite ends of the cross beam  
13 member 26 are secured to front pillars 11a and 12a of the first and  
14 second side frame structures 11 and 12 by welding or by other fixation  
15 means. The cross beam member 26 may be provided as an  
16 independent member, or may be arranged to form part of the roof  
17 section 15 if desired. However, it is difficult to provide the cross beam  
18 member 26 integrally with the front section 13 of the cab because the  
19 front window 23 which occupies virtually all of the entire front section  
20 13 is normally required to be openable. In this respect, it is the general



1 practice to move the front window in a vertical direction at the time of  
2 opening and closing same. Further, as shown in Fig. 4, another cross  
3 beam member 28 is provided under the front window 23. This lower  
4 cross beam member 28 is bridged between lower front corner portions  
5 of the first and second side frame structures 11 and 12.

6 Various loads are possibly imposed on the cab 10, but a load of  
7 extremely great magnitude is imposed on the cab 10 especially at the  
8 time of a fall. For instance, when a power shovel type excavator is  
9 operating on a sloped ground or on a heap of destruction debris, it  
10 always has a possibility of losing balance and falling on the ground  
11 depending upon working conditions of the machine. There is little  
12 possibility of a falling load directly acting on the cab 10 in case the  
13 excavator is caused to fall down on the side of the front working  
14 mechanism 7. However, when the power shovel type excavator  
15 happens to fall down on the opposite side of its body, upper portions of  
16 the cab 10 are caused to collide strongly against a ground surface to  
17 receive a falling load of extremely large magnitude in a compressing  
18 direction for the cab 10.

19 Therefore, the cab 10 should be sturdy enough at least to evade  
20 serious deformation or collapsing in case it is subjected to a load of

1 extremely large magnitude like the falling load. The rear frame  
2 structure 14 which is provided at the rear side of the cab 10 is strong  
3 enough in this regard, while the cross beam member 26 is provided as  
4 a reinforcing member on the front side of the cab 10. However, if the  
5 cross beam member 26 alone were to support all of imposed loads, it  
6 may become necessary to a cross beam member 26 of a large size  
7 which would block the view field of the operator in the cab 10 to an  
8 objectionable degree.

9 Therefore, for reinforcing the front side of the cab 10 to protect  
10 same from an extremely large load which would otherwise cause  
11 serious deformation or collapsing to the cab 10, a reinforcing structure  
12 to be employed should be arranged to guarantee a wide view filed for  
13 the operator as much as possible. For this purpose, according to the  
14 present embodiment of the invention, a reinforcing beam member 30 is  
15 provided at the front side of the cab 10 substantially in parallel relation  
16 with the cross beam 26. In this instance, the reinforcing member 30 is  
17 in the form of a hollow metallic rod-like structure like a steel pipe, and,  
18 may be arranged to present either a circular shape as indicated at 200  
19 in Fig. 6 or a triangular shape as indicated at 301 in Fig. 7. No matter  
20 whether the shape of the reinforcing beam member 30 is circular or

1 triangular, it is desirable to fill the internal cavity of the reinforcing  
 2 beam member 30 with a foamed synthetic resin like foamed urethane  
 3 resin for the purpose of enhancing its bending strength.

4 As shown particularly in Fig. 8, the opposite ends of the  
 5 reinforcing beam member 30 are connected to and supported by  
 6 brackets 32, which are securely welded to upper front portions of  
 7 pillars 11a and 12a of the first and second side frame structures 11  
 8 and 12. In this regard, it is most desirable to set the reinforcing beam  
 9 member 30 in a position within a hidden space S where the reinforcing  
 10 beam member 30 is almost entirely concealed behind the cross beam  
 11 26 when an operator who is seated on the operators looks up toward  
 12 the cross beam member 26. However, since the angle of the hidden  
 13 space S changes more or less depending upon the seated height of the  
 14 operator, desirably the reinforcing beam member 30 is located in such  
 15 a position where a major part of the reinforcing member 30 is concealed  
 16 behind the cross beam 26 when viewed by an operator of an average  
 17 seated height.

18 The greater the diameter of the reinforcing beam member 30, the  
 19 stronger becomes its strength. However, if the diameter of the  
 20 reinforcing member 30 is thickened to a large excessive degree, it can

bulge out from behind the cross beam member 26 to narrow the view field of the operator to some extent depending upon the viewing position of the operator. However, a reinforcing beam member 30 of a large diameter can be suitably located to fall substantially within the concealed space S behind the cross beam 26 without restricting the view field of the operator to any material degree, in case the reinforcing beam member 30 is shifted to a position which is at a greater distance from the cross beam member 26. Accordingly, a reinforcing beam member 30 of a suitable diameter can be employed from the standpoint of strength, and, in order to guarantee a broad view field for the operator, its mounting position is shifted in an obliquely upward direction from the cross beam 26 depending upon its diameter,

For instance, suppose that a power shovel type excavator happens to lose balance and fall down on the ground while it is operating on a sloped ground as indicated by two-dot chain line in Fig. 10. In this case, an extremely large falling load is imposed on the machine as indicated by an arrow, tending to compress the cab 10 between the ground and the boom 7a of the front working mechanism 7. However, the imposed falling load is effectively supported by the cross beam 26 and the reinforcing beam member 39 to prevent crucial

1 collapsing or crushing of the cab 10. Namely, the shape retainability of  
2 the cab 10 under a falling load can be improved to a considerable  
3 degree to insure safety of an operator within the cab 10.

4 Thus, although the reinforcing beam member 30 is located in a  
5 position obliquely upward of an operator in the cab 10, it is almost  
6 concealed behind the cross beam member 26 in overlapping relation  
7 with the latter. Therefore, there is little possibility of the reinforcing  
8 beam member 30 blocking a forward or upward view field of the  
9 operator who is operating the front working mechanism 7, for example,  
10 for excavating earth at a height or for loading excavated earth onto a  
11 dump truck. Accordingly, the operator can operate the front working  
12 mechanism safely in a smooth and accurate manner. Besides, thanks  
13 to the provision of the reinforcing member 30 of high strength, it  
14 becomes possible to reduce the diameter or thickness of the cross beam  
15 member 26 which is no longer primarily depended upon for strength.  
16 This means that a view field of an operator in the cab 10 can be  
17 broadened further and dead angles in the operator's view field can be  
18 suppressed to minimum. Further, the provision of the reinforcing  
19 beam member 30 in addition to the cross beam member 26 contributes  
20 to suppress vibrations of the cab which is shaken during operation of

1 the power shovel type excavator, particularly, to suppress vibrations of  
2 front portions of the first and second side frame structures. It follows  
3 that the provision of the reinforcing beam member 30 also contributes  
4 to suppress noises and to prevent accelerated deteriorations of sealing  
5 effects by the seal members 27.

6 The reinforcing beam member 30 can be mounted fixedly in  
7 position on the front side of the pillars 11a and 12a by the use of the  
8 mount structure as shown in Fig. 8. However, in order to let the  
9 reinforcing beam member 30 support a falling load before the cross  
10 beam member 26, it may be mounted in position by the use of brackets  
11 132 as shown in Fig. 11. In this case, the brackets 132 are securely  
12 fixed to the pillars 11a and 12a in such a way as to hold outer corner  
13 portions of the latter and are thick enough to project laterally on the  
14 outer side of the first and second side frame structures 11 and 12,  
15 respectively. In this connection, it has been the general practice to  
16 provide a handrail on the pillar 11a of the first side frame structure 11  
17 to assist an operator at the time of climbing up into or climbing down  
18 from the cab 10. In such a case, from the standpoint of vehicle body  
19 width in transportation, it is desirable that the lateral projection of the  
20 bracket 132 does not exceed such a handrail.

1           Alternatively, the reinforcing beam member 30 can be mounted  
2           in the manner as shown in Fig. 12. In this case, the reinforcing beam  
3           member 20 is flattened portions 30a at its opposite ends, while mount  
4           members 232 are securely welded to the front pillars 11a and 12a of  
5           the first and second side frame structures 11 and 12. The flattened  
6           opposite end portions 30a of the reinforcing beam member 30 are  
7           securely fixed to the mount members 232 by means of bolts 230.

8           Further, since the cross beam member 26 is in the form of a  
9           hollow structural material, the reinforcing beam member 30 can be  
10          passed through the internal cavity of the hollow cross beam member 26  
11          as shown in Fig. 13. In this case, the reinforcing beam member 30  
12          which is totally concealed in the cross beam member 26 has no  
13          possibility of blocking a view field of an operator.

14          The reinforcing beam member 30 is a structural member of high  
15          strength which is projected forward from an upper front portion of the  
16          cab 10. Therefore, it can also serve as a member for mounting various  
17          accessories such as lighting equipment, mirrors, rock protector covers  
18          against dropping rocks or stones, sun shades, wipers etc. For example,  
19          lighting lamp assemblies 40 can be mounted on the reinforcing beam  
20          member 30 as shown in Figs. 14 and 15.

As clear from these figures, each lighting lamp assembly 40 has a connecting shaft member 41 on the lower side. The lower end of the connecting shaft 41 is terminated with a screw portion of a reduced diameter. The screw portion at the lower end of the connecting shaft 41 is passed through a horizontal section of a bracket 42 of a rectangular inverted L-shape, and a nut 43 is threaded on the screw portion of the connecting shaft 41 to set the lamp assembly 40 fixedly on the support plate 42. The other vertical section of the bracket 42 is securely fixed by a screw 45 to a flat fore extension 44b of a support plate 44, which is bent through 90 degrees relative to a main body portion 44a of the support plate 44. The main body portion 44a of the support plate 44 is provided with a pair of apertures in vertically aligned positions to receive screw portions at the fore ends of a U-shaped clamp member 46 which is fitted on the reinforcing beam member 30. Clamp nuts 47 are threaded onto the screw portions of the clamp member 46 to fasten the support plate 44 tightly against the reinforcing beam member 30.

If desired, a plural number of similar lighting lamp assemblies 40 can be mounted in arbitrary positions along the reinforcing beam member 30 in the same manner. By loosening the nut 43, the



connecting shaft member 41 can be turned to adjust the lighting direction of the lamp assembly 40 in the horizontal direction. Besides, by loosening the screw 45, the lamp assembly 40 can be turned up or down in the vertical direction. After adjusting the lighting lamp assembly 40 into a desired position and direction, the clamp nut 45 is tightened against the support plate 44, and then the screw 45 and nut 43 are tightened to fix the lamp assembly 30 in position.

#### POSSIBILITIES OF INDUSTRIAL UTILIZATION

With the construction machine cab construction according to the present invention as described above, crucial deformation or collapsing of the cab is prevented even in case a load of an extremely large magnitude like a falling load is imposed on the cab, because the imposed load is effectively supported by the reinforcing beam member. Besides, despite the reinforcement of the cab strength by addition of the reinforcing beam member, an operator in the cab can have a broad view field in all of necessary directions in operating the front working mechanism of the machine, and thus can control the construction machine including the front working mechanism efficiently without sacrificing safety of operation to any degree whatsoever.